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EXAMINER	
FETTEROLF, BRANDON J	
ART UNIT	PAPER NUMBER
1642	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/408,905	WALSH, KENNETH	
	Examiner	Art Unit	
	Brandon J. Fetterolf, PhD	1642	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5 and 39-58* is/are pending in the application.

4a) Of the above claim(s) *51-58* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5 and 39-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn (see remarks filed on 9/18/2006, page 6)

Election/Restrictions

The Election filed on December 18, 2006 in response to the Restriction Requirement of 11/02/2006 has been entered. Applicant's election, with traverse, of Group I, claims 1-3, 5 and 39-50, as specifically drawn to a method of treating myocardial infarction comprising administering to a subject in need of such treatment an Akt nucleic acid in an amount effective to inhibit cardiac tissue necrosis in a subject has been acknowledged. The traversal is on the grounds that Applicants believe that no significant burden of search would be placed upon the examiner by requiring examination of both Groups, by requiring examination of all species set forth in the restriction and election of species requirement. In addition, Applicants contend, with respect to Group I, that SEQ ID NO: 1, 3 and 5 all encode an Akt polypeptide which share at least 98% amino acid sequence identiy with SEQ ID NO: 2, and that SEQ ID NOs: 2, 4 and 6 all share at least 98% amino acid sequence identity with SEQ ID NO: 2.

These arguments have been carefully considered, but are not found persuasive.

As to the question of burden of search, the Examiner recognizes that the the inventions are classified differently, which would necessitate different searches of the US Patents. Further, classification of subject matter is merely one indication of the burdensome nature of the search involved. The literature search, particularly relevant in this art, is not coextensive and is much more important in evaluating the burden of search. Different searches and issues are involved in the examination of each group. Regarding the different SEQ ID NOs:, the Examiner recognizes that there are approximately eight different databases that accompany the results of a search of <u>one</u> discrete amino acid <u>or</u> nucleotide sequence and each result set from a particular database must be carefully considered. Hence, the search of three different nucleotide sequences and three different amino acid sequences and their segments thereof in combination with the required method would require extensive searching and review.

For these reasons the restriction requirement is deemed to be proper and is therefore made FINAL.

Claims 1-3, 5 and 39-58 are currently pending.

Claims 51-58 are withdrawn from consideration as being drawn to a non-elected invention.

Claims 1-3, 5 and 39-50 are currently under consideration.

Species Election

The Election of the following species is acknowledged: NA: SEQ ID NO: 1 and AA: SEQ ID NO: 2. However, the species election has been withdrawn by the Examiner upon further review and reconsideration.

Rejection Maintained:

Note: For clarification purposes, the Examiner has incorporated the articles cited in the prior office action and has reformatted the previous rejection to show the Wands Analysis.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, 5 and 39-50 remain rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for:

A method of treating a subject for myocardial infarction, comprising the step of: administering to the subject in need of such treatment a composition comprising a replication-defective adenovirus comprising a polynucleotide, wherein said composition is administered acutely into the apical and anterolateral free wall of the heart, wherein said polynucleotide comprises a nucleotide sequence that encodes an Akt polypeptide, operatively linked to a promoter to promote expression of the Akt polypeptide in cardiomyocytes, wherein the Akt polypeptide comprises: the amino acid sequence of SEQ ID NO: 2.

--does not reasonably provide enablement for the broadly claimed invention. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims.

The factors to be considered in determining whether undue experimentation is required are summarized In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988). The court in Wands states: "Enablement is not precluded by the necessity for some experimentation such as routine screening. However, experimentation needed to practice the invention must not be undue experimentation. The key word is 'undue,' not 'experimentation.' " (Wands, 8 USPQ2d 1404). Clearly, enablement of a claimed invention cannot be predicated on the basis of quantity of experimentation required to make or use the invention. "Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations." (Wands, 8 USPQ2d 1404). The factors to be considered in determining whether undue experimentation is required include: (1) the nature of the invention, (2) the relative skill of those in the art, (3) the breadth of the claims, (4) the amount or direction or guidance presented, (5) the presence or absence of working examples, (6) the quantity of experimentation necessary, (7) the state of the prior art, and (8) the predictability or unpredictability of the art.

Although the quantity of experimentation alone is not dispositive in a determination of whether the required experimentation is undue, this factor does play a central role. For example, a very limited quantity of experimentation may be undue in a fledgling art that is unpredictable where no guidance or working examples are provided in the specification and prior art, whereas the same amount of experimentation may not be undue when viewed in light of some guidance or a working example or the experimentation required is in a predictable established art. Conversely, a large quantity of experimentation would require a correspondingly greater quantum of guidance, predictability and skill in the art to overcome classification as undue experimentation. In Wands, the determination that undue experimentation was not required to make the claimed invention was based primarily on the nature of the art, and the probability that the required experimentation would result in successfully obtaining the claimed invention. (Wands, 8 USPQ2d 1406) Thus, a combination of factors which, when viewed together, would provide an artisan of ordinary skill in the art with an expectation of successfully obtaining the claimed invention with additional experimentation would preclude the classification of that experimentation as undue. A combination

of Wands factors, which provide a very low likelihood of successfully obtaining the claimed invention with additional experimentation, however, would render the additional experimentation undue.

The nature of the invention

The claims are drawn to a method of treating myocardial infarction comprising administering to a subject in need of such treatment of Akt nucleic acid. As such, the claims encompass treating myocardial infarctions via gene therapy. The invention is in a class of invention which the CAFC has characterized as "the unpredictable arts such as chemistry and biology." Mycogen Plant Sci., Inc. v. Monsanto Co., 243 F.3d 1316, 1330 (Fed. Cir. 2001).

Level of skill in the art

The level of skill in the art is deemed to be high, generally that of a PhD or MD.

The breadth of the claims

Applicants broadly drawn to a method for treating myocardial infarction comprising administering to a subject in need of such treatment an Akt nucleic acid in an amount to inhibit cardiac tissue necrosis in a subject, wherein the Akt nucleic acid comprises a nucleic acid sequence encoding an Akt polypeptide which shares at least 98% amino acid identity with SEQ ID NO: 2, wherein said Akt nucleic acid is administered acutely into cardiac tissue.

Guidance in the specification and Working Examples

The specification teaches that Akt promotes survival of cardiomyocytes in vitro and protects against ischemia reperfusion injury in mouse heart in vivo (page 48, Example 4). For example, the specification teaches that replication-defective adenoviral constructs expressing constitutively –active Akt (adeno-myrAkt) were constructed and injected into the apex and anterolateral wall of the heart, wherein the constitutively-active Akt protected against yocyte apoptosis in response to ischemia-reperfusion injury (page 48, Example 4). Thus, while the specification appears to have provided the optimal combination of vector, delivery system and Akt gene for this application, the specification provides little guidance to one of skill in the art in terms of how to make or use the invention as claimed because the claims encompass any specific delivery protocol, vector system, or delivery locale within the cardiac tissue. Reasonable correlation must exist between the scope of the claims and scope of enablement.

Quantity of experimentation

The quantity of experimentation in the areas of gene therapy is extremely large given the unpredictability associated with using polynucleotides for the treatment or prevention of a disorder, as underscored by the prior art.

The unpredictability of the art and the state of the prior art

The state of the art at the time of filing was such that one of skill could recognize the unpredictability of treating a disease by a method of gene therapy. For example, Crystal, R. (Science, Vol. 270, 1995, pages 404-410) teaches (page 409) that there are many obstacles to successful human gene therapy including inconsistent results, studies in experimental animals are not predictive in humans, and vector production problems. Further, Anderson, W. (Nature, 1998, Vol. 392, pages 25-30) teaches that although gene therapy as a treatment for disease holds great promise, progress in developing effective clinical protocols has been slow. Anderson adds that the problem lies in the development of safe and efficient gene-delivery systems. Moreover, gene therapy comprising the administration of recombinant nucleic acids involving *in vivo* or *ex vivo* methods have not seen any success despite a great deal of work and resources. Several reviews in the art show that difficulties with vector selection, mode of delivery and persistence of predictable and effective levels of expression of the protein, created technical barriers to the practice of gene therapy methods. Verma et al states that, "[t]he Achilles heel of gene therapy is gene delivery...", and that, "most of the approaches suffer from poor efficiency of delivery and transient expression of the gene" (Verma et al. (1997) Nature Volume 389, page 239, column 3, paragraph 2). Marshall concurs, stating that, "difficulties in getting genes transferred efficiently to target cells- and getting them expressed-remain a nagging problem for the entire field", and that "many problems must be solved before gene therapy will be useful for more than the rare application" (Marshall (1995) Science, Volume 269, page 1054, column 3, paragraph 2, and page 1055, column 1).

Numerous factors complicate the gene therapy art which have not been shown to be overcome by routine experimentation. Eck et al. (Goodman & Gilman's The Pharmacological Basis of Therapeutics (1996), 9th Edition, Chapter 5, McGraw-Hill, NY) explains, "the delivery of exogenous DNA and its processing by target cells requires the introduction of new pharmakinetic

paradigms beyond those that describe the conventional medicines in use today". Eck et al teaches that with *in vivo* gene transfer, one must account for the fate of the DNA vector itself (volume of distribution, rate of clearance into the tissues, etc.), the *in vivo* consequences of altered gene expression and protein function, the fraction taken up by the target cell population, the trafficking of the genetic material within cellular organelles, the rate of degradation of the DNA, the level of mRNA produced, the stability of the mRNA produced, the amount and stability of the protein produced, and the protein's compartmentalization within the cell or its secretory fat, once produced. These factors differ dramatically based on the vector used, the protein being produced and the disease being treated (see Eck et al, bridging pages 81-82).

Also among the many factors that the art teaches affect efficient gene delivery and sustained gene expression are, immune responses and the identity of the promoter used to drive gene expression. Verma et al teaches, in reference to *ex vivo* methods, that weak promoters produce only low levels of therapeutically effective protein, and that only by using appropriate enhancer-promoter combinations can sustained levels of therapeutically effective protein be achieved (Verma et al, *supra*, page 240, column 2). Verma et al further warns that, "...the search for such combinations is a case of trial error for a given cell type" (Verma et al, *supra*, page 240, bridging sentence of columns 2-3). The state of the art is such that no correlation exists between successful expression of a gene and a therapeutic result (Ross et al, Human Gene Therapy,1996, Volume 7, pages 1781-1790, see page 1789, column 1, first paragraph). Thus, the art at the time at the time of filing clearly establishes that expectation for achieving a desired therapeutic effect in vivo by expressing a therapeutic gene using any of the expression constructs known in the art was extremely low.

More recently, Rubanyi (Mol. Aspects Med. (2001) 22:113-142) teaches that the problems described above remain unresolved. Rubanyi states, "[a]lthough theoretical advantages of [human gene therapy] are undisputable, so far [human gene therapy] has not delivered the promised results: convincing clinical efficacy could not be demonstrated yet in most of the trials conducted so far..." (page 113, paragraph 1). Among the technical hurdles that Rubanyi teaches remain to be overcome are problems with gene delivery vectors and improvement in gene expression control systems (see "3. Technical hurdles to be overcome in the future", beginning on page 116 and continued through page 125). Furthermore, Juengst (British Medical Journal (2003) Volume 326, pages 1410-1411) teaches the unpredictable nature of gene therapy and that a few of the apparent successes actually

developed T cell-acute lymphoblastic leukemia due to insertional mutagenesis at or near the LMO-2 gene causing altered gene expression. The art has demonstrated that a large amount of experimentation has already been performed without demonstrating successful gene therapy methods for treatment of disease.

Conclusion

Thus given the broad claims in an art whose nature is identified as unpredictable, the unpredictability of that art, the lack of guidance provided in the specification and the negative teachings in the prior art balanced only against the high skill level in the art, it is the position of the examiner that it would require undue experimentation for one of skill in the art to perform the method of the claim as written.

In response to this rejection, Applicants assert that the teachings of the specification, including, but not limited to, the working examples provided in the specification, are sufficiently enabling such that one of ordinary skill in the art can make and use the instant claimed invention. For example, Applicants submit that Example 4, which the Examiner acknowledges is enabled, provides a working example of a method of treating a subject for myocardial infarctions using a replication-defective adenovirus, wherein a subject is administered a composition comprising an Akt polynucleotide which is administered acutely into the apical and anterolateral free wall of the heart. However, Applicants assert that the invention is not strictly limited to that particular exemplified embodiment, as suggested by the Examiner. Moreover, Applicants assert that there is no requirement to provide a working example for any embodiments, let alone all of the embodiments. Provided that the instant embodiment is enabled, Applicants assert that an Akt polynucleotide sequence that shares at least 98% sequence identity with that of SEQ ID NO: 2, are also enabled. For example, Applicants assert that the specification sequences of Akt polynucleotides encoding Akt polypeptides that share at least 98% amino acid sequence identity with SEQ ID NO: 2; and further, the claimed invention teaches a method of treating myocardial infarction comprising administering such Akt molecules *in an amount effective to inhibit cardiac tissue necrosis* in a subject. Therefore, Applicants argue that it is understood by those skilled in the art that the biological activity of the Akt polypeptides sharing at least 98% amino acid identity with SEQ ID NO: 2 as claimed is retained such that they are functionally equivalent to the Akt polypeptide of SEQ ID NO: 2. Moreover,

Applicants assert that by the instant amendment, it is specified that the Akt nucleic acid is administered acutely into cardiac tissue. Thus, Applicants contend that each component of the method of treatment, e.g., the composition, the target subject, the location of administration, and the routes/mode of administration is provided. In addition, Applicants contend that the enabling delivery method should not be limited to replication-defective adenovirus, which was taught merely as an example, as suggested by the Examiner. In particular, Applicants contend that at the time of the filing of the instant application, the various delivery methods disclosed in the specification on page 5, lines 12-15 were known in the art and that experimental protocols for making them and using them were readily available. For example, Applicants submit the following publications: San et al. (Hum Gene Ther 1993; 4: 781-788) used cationic lipids as a non-viral delivery vector to from DNA liposome complexes for in vivo use; Zhu et al. (Science 1993; 261: 209-211) successfully demonstrated systemic gene expression after intravenous DNA delivery into adult mice by injection of expression plasmid: liposome complexes; Gal et al. (Lab. Invest. 1993; 68: 18-25) showed direct myocardial transfection in two animal models, in which pure DNA was injected into skeletal and cardiac muscles; Coffin et al. (Gene Ther 1996; 3: 560-566) reported that herpes simplex virus 1 (HSV1) can be successfully employed for gene therapy in the rat heart in vivo; and Prentice et al. (J. Mol. Cell Cardiol. 1996: 28: 133-140) demonstrated that ischemic/reperfused myocardium can express recombinant protein following direct DNA or retroviral injection. Thus, Applicants assert that a number of published studies established, prior to the filing of the instant application, that in various animal models gene delivery, as well as expression of foreign proteins, was feasible and effective by the use of a variety of delivery methods, including replication-defective adenovirus, modified adenovirus, retrovirus, herpes simplex virus, liposomes, and purified plasmids. Furthermore, Applicants assert that according to a review article published in 1997 by Feldman and Steg (Cardiovascular Res. 1997; 35: 391-344), cardiovascular gene therapy is no longer a prophetic therapy but " a clinical reality". Thus, Applicants assert that these methods were publicly known or readily available to those skilled in the art at the time of the filing of the instant application. Optimization is not the proper standard and should not be, per se, in any case considered "undue experimentation", for a person skilled in the art would appreciate the need for optimizing to each application and that it is within routine practice inherent to the art. With regards to the Eck et al. and Rubanyi et al. references, cited by the examiner in the prior office action, Applicants assert that

the discussion in each of these references pertains to the domain of the Food and Drug Administration and to a standard relevant to clinical applications, that extends well beyond what is necessary to satisfy the enablement requirement under 23 USC 112, fist paragraph.

These arguments have been carefully considered, but are not found persuasive.

In response to Applicants assertions pertaining to the teachings of the specification, the Examiner acknowledges and agrees with Applicants assertion that the specification need not describe how to make and use every possible variant of the claimed invention. However, the Examiner recognizes that although the quantity of experimentation alone is not dispositive in a determination of whether the required experimentation is undue, this factor does play a central role. For example, a very limited quantity of experimentation may be undue in a fledgling art that is unpredictable where no guidance or working examples are provided in the specification and prior art, whereas the same amount of experimentation may not be undue when viewed in light of some guidance or a working example or the experimentation required is in a predictable established art. Conversely, a large quantity of experimentation would require a correspondingly greater quantum of guidance, predictability and skill in the art to overcome classification as undue experimentation. In Wands, the determination that undue experimentation was not required to make the claimed invention was based primarily on the nature of the art, and the probability that the required experimentation would result in successfully obtaining the claimed invention. (Wands, 8 USPQ2d 1406) Thus, a combination of factors which, when viewed together, would provide an artisan of ordinary skill in the art with an expectation of successfully obtaining the claimed invention with additional experimentation would preclude the classification of that experimentation as undue. A combination of Wands factors, which provide a very low likelihood of successfully obtaining the claimed invention with additional experimentation, however, would render the additional experimentation undue. In the instant case, while the specification appears to have provided the optimal combination of vector, delivery system and Akt gene for this application, the specification provides little guidance to one of skill in the art in terms of how to make or use the invention as claimed because the claims encomapss any specific delivery protocol, vector system, or delivery locale within the cardiac tissue. Thus, it is the position of the Examiner given the unpredictability of that art, the lack of guidance provided in the specification, and the negative teachings in the prior art balanced only against the high skill level in the art, that it would require undue experimentation for

one of skill in the art to perform the method of the claim as written. Regarding Applicants contention that it is predictable that the Akt polypeptide encoded by the nucleic acid cited in the claims and human Akt would have the same biological function based on their high sequence homology, the Examiner acknowledges and concedes that in some instances homology between two polypeptides can predict biological function. However, the Examiner recognizes that while the ultimate factor having the therapeutic effect is the Akt polypeptide, the claims under consideration are drawn to administration of a nucleic acid, e.g., gene therapy, and not to the administration of the polypeptide. In the instant case, there are several reviews in the art which show that difficulties with vector selection, mode of delivery and persistence of predictable and effective levels of expression of the protein, have created technical barriers to the practice of gene therapy methods. For example, Verma et al states that, "[t]he Achilles heel of gene therapy is gene delivery...", and that, "most of the approaches suffer from poor efficiency of delivery and transient expression of the gene" (Verma et al. (1997) Nature Volume 389, page 239, column 3, paragraph 2). Marshall concurs, stating that, "difficulties in getting genes transferred efficiently to target cells- and getting them expressed-remain a nagging problem for the entire field", and that "many problems must be solved before gene therapy will be useful for more than the rare application" (Marshall (1995) Science, Volume 269, page 1054, column 3, paragraph 2, and page 1055, column 1). Regarding Applicants assertions that a number of published studies prior to the filing date of the instant application have clearly established that gene delivery is feasible and effective by the use of a variety of delivery methods, the Examiner acknowledges and appreciates Applicants submission of these publications. However, the Examiner recognizes that these publications do not appear to be commensurate in scope with the instant invention which is drawn to treatment of myocardial infarction using an Akt nucleic acid effective to inhibit cardiac tissue necrosis in the subject. In other words, as stated by Feldman and Steg in the 1997 review submitted by Applicants, "[N]early all cardiovascular diseases are amenable to gene therapy, but **the optimal combination of vector, delivery system and therapeutic gene is likely to be unique to each application**." (emphasis added). Thus, in view of Feldman and Steg, it appears that the unique combination of all three components, and not just one or two, results in cardiovascular diseases being amenable to gene therapy. Regarding Applicants assertion that the domains addressed by Eck et al. and Rubanyi et al., cited by the Examiner, are not the relevant standard for enablement under 35 USC 112, first paragraph, the Examiner agrees with

Applicants statement that it is within the domain of the Food and Drug Administration, and not the Patent office, to determine whether a pharmaceutical composition or treatment is safe and effective when applied to human trials. However, the Examiner recognizes that while Applicants have focused on the relationship between gene therapy and the development of a safe and efficient gene-delivery system from a clinical standpoint, it is apparent that those of skill in the art recognize that the optimal combination of vector, delivery system and therapeutic agent is likely to be unique in each application, as stated by Feldman and Steg. Thus given the broad claims in an art whose nature is identified as unpredictable, the unpredictability of that art, the lack of guidance provided in the specification and the negative teachings in the prior art balanced only against the high skill level in the art, it is the position of the examiner that it would require undue experimentation for one of skill in the art to perform the method of the claim as written.

Therefore, NO claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brandon J. Fetterolf, PhD whose telephone number is (571)-272-2919. The examiner can normally be reached on Monday through Friday from 7:30 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shanon Foley can be reached on 571-272-0898. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brandon J Fetterolf, PhD
Patent Examiner

Art Unit 1642

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